

OSAC RESEARCH NEEDS ASSESSMENT FORM



Title of research need: Friction Ridge Statistical Modeling

Describe the need:

Expanded research on different statistical models that can be used in association with a friction ridge comparison. (1) Approaches for quantification of evidence that are fit for purpose. (2) Evaluation of candidate model approaches in terms of their theoretical validity, potential for misuse or misinterpretation, and generality of application. (3) Identification of types of databases that will be needed to support proposed approaches. (4) How to best communicate the results to the courts.

Keyword(s): statistics, friction ridge, statistical models, likelihood ratios, stats,

Submitting subcommittee(s): Friction Ridge **Date Approved:** 2/1/2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Standard for Friction Ridge Examination Conclusions.
Best Practice Recommendation for Articulating a Source Identification in Friction Ridge Examination.
Standard for Reporting Results from Friction Ridge Examinations.
Standard for Examining Friction Ridge Impressions.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

Neumann (in progress);
De Donno is working on a model named XENA that is briefly presented in Stoney, D. A., De Donno, M., Champod, C., Wertheim, P. A., & Stoney, P. L. (2020). Occurrence and associative value of non-identifiable fingerprints. Forensic Science International, 309, 110219. <https://doi.org/10.1016/j.forsciint.2020.110219>

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

Please see Appendix "A" for a normative bibliography related to this research topic.

For a comprehensive and informative bibliography related to friction ridge examination please see Appendix "B": The 2011 SWGFAST response to the Research, Development, Testing & Evaluation Inter-Agency Working Group of the National Science and Technology Council, Committee on Science, Subcommittee on Forensic Science.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at <https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest>? Is your research need identified by NIJ?

Scientific Research; Technology Development; Policy or Protocol Development: Scientific foundations for expert conclusions of forensic evidence, Development and validation of standardized forensic methods and conclusions, Practical statistical approaches for the interpretation of forensic evidence, Evaluation of qualified language of association along the continuum from investigative leads to definitive conclusions

5. In what ways would the research results improve current laboratory capabilities?

Latent prints that are currently not utilized due to lack of sufficiency will now provide some value, even if limited, in bench work. This type of technique will improve examiner awareness of the quantitative value of the evidence they are analyzing, as well as increasing efficiency by focusing examiner resources on the appropriate evidence. These types of models will also assist the examiner by supporting and adding weight to current examination techniques and conclusions.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Statistical modeling has made significant progress in the last ten or so years by improving our understanding of overall match probabilities. However, there are still questions regarding the reliability of these models in specific cases. Without general acceptance, the Friction Ridge Subcommittee will have difficulty establishing standards on the use of statistics during friction ridge examination.

7. In what ways would the research results improve services to the criminal justice system?

Improved statistical modeling will increase confidence that the criminal justice system has in fingerprint evidence. New models will improve the overall value of friction ridge evidence by making it more comprehensible to the judicial system.

8. Status assessment (I, II, III, or IV):

II

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.